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EXAMINER

TUNG, TA HSUNG

ART UNIT

PAPER NUMBER

1753

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/830825

Applicant(s)

SCHNEER

B.TAL

Examiner

C. TUNG

Group Art Unit

1753

Paper No. 8

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on 1-23-03
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 24-47 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 24-47 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☒ All ☐ Some* ☐ None of the:
 - ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other _____

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The restriction requirement is hereby withdrawn.

Claims 24-47 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The disclosure is inadequate in that the method for forming the sensor element is inadequate. The only description of the method in the specification appears to be at page 4, lines 23-34. From this very brief discussion, it is unclear how the measuring gas chamber and the reference gas channel are formed from the pasty layer of solid electrolyte. Also, is the partition 12 between the measuring gas chamber and the reference gas channel part of the solid electrolyte layer 11b? If yes, why is the partition sectioned as a different material from layer 11b? If not, how is the partition formed? Further, how is diffusion barrier 27 formed?

Applicant should note that the test for adequate disclosure is what is actually disclosed, not what may be obvious from the disclosure. This is particular so when applicant is claiming a method for forming the sensor element.

Claim 45, it is not evident what element is this "supporting element". Where is the related discussion in the specification?

Claims 24-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 24, it is not evident what is the state of the device being claimed. The last line of the claim calls for a ceramic paste. When a ceramic paste layer is in that state, the measuring gas chamber, the reference gas channel and the partition between them are clearly not yet in existence. Correspondingly, the final sensor product would not have a paste layer. So, is applicant claiming the final product, some intermediate precursor, what? For the purpose of this rejection, the claims are construed as to call for the presence of a pasty layer.

Claim 43, lines 4-6, the wording is considered to be misdescriptive. It is not evident how a pasty ceramic layer with a measuring gas chamber and a reference gas channel can be applied to the solid electrolyte foil, because when the ceramic layer is in the form of a paste, no chamber or channel has yet been formed.

Clarification of the claim language by applicant in a response may necessitate a change in the prior art rejection (including the citation of additional prior art). If so, such change would not prevent the finality of any further rejection.

Claim 26, the wording is vague. Does applicant mean that the partition is in contact with the measuring electrode?

Claim 28, the wording is vague. Does applicant mean that the reference electrode contacts the partition?

Claim 31, line 2, --inner-- should be added before "pump" (2d occ) to point out which pump electrode.

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Claim 45, line 2, it is not evident which element is this “supporting element” in the reference gas chamber. Is it the same as the porous ceramic filler material, as recited in claim 40?

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24-28, 33-35, 37, 40, 41, 43-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Friese et al 5,314,604.

Friese discloses a sensor element comprising a zirconia solid electrolyte layer 2 that has a reference gas channel 10. A measuring gas chamber with an inner pump electrode 8-8' can also be considered to be in solid electrolyte 2 because the measuring gas chamber appears to be partly in the electrolyte. Therefore, the measuring gas chamber and the reference gas channel are in the “same layer plane”. Element 9 is a measuring electrode, while element 11 is a reference electrode. See col. 3, lines 14-63. At col. 4, lines 15-20, the patent states that the solid electrolytes sheets can be formed by screen printing.

As for claim 27, see figure 1B. As for claim 40, see col. 4, line 31.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24-28, 33-35, 37, 40, 41, 43-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al in view of Schneider et al 5,529,677, Jach et al 6,375,816 or Logothetis et al 4,487,680.

If Friese were construed as not to disclose forming a solid electrolyte layer by coating a paste, applicant's claims differ in that respect.

Schneider discloses forming a zirconia layer onto another layer by screen printing a zirconia paste layer thereunto. See col. 4, lines 40-55. Jach discloses forming a ceramic layer 22 that contains a gas chamber 21 onto a solid electrolyte layer by coating a paste of the ceramic material and then sintering. See col. 3, lines 23-57. Logothetis discloses forming a zirconia layer unto another zirconia layer by screen printing. See col. 5, lines 57-67.

Jach's filing date of Dec. 14, 1999 is prior to applicant's filing date but subsequent to applicant's priority date of Aug. 28, 1999. However, Jach is a reference until applicant submits a certified translation of his priority document to substantiate a commonality of subject matter.

It would have been obvious for Friese to form zirconia layer 2 by screen printing onto solid electrolyte layer 1 or 3 in view of Schneider, Jach or Logothetis, since screen printing is a well-known technique for forming films. This is especially true, when Friese itself also discloses (col. 4, line 18) screen printing to be a common technique for joining layers. The incorporation of

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known technique from analogous prior art is within the skill of the art in the absence of unexpected result.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Ep 678740 or Nakae et al 5,298,147.

This claim further differs by calling for the measuring electrode to be opposite the inner pump electrode.

Ep discloses a measuring electrode 22 opposite an inner pump electrode 16 in a sensor element similar to those of Friese and applicant. See figure 2; col. 11, line 27 to col. 13, line 40. Nakae discloses a measuring electrode 28 opposite an inner pump electrode 27. See figure 2; col. 4, lines 10-59.

It would have been obvious for Friese to locate the measuring electrode and the inner pump electrode opposite each other in view of Ep or Nakae so as to minimize the lateral dimension. Solid electrolyte sensors are typically very small. Any design to minimize a dimension or save space would be desirable.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Kato et al 6,059,947.

This claim further differs by calling for the inner pump electrode to also serve as the measuring electrode.

Kato discloses electrode 24 serving both as an inner pump electrode and as a measuring electrode. See figure 2; col. 6, line 54 to col. 9, line 19. It would have been obvious for Friese to

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combine the inner pump electrode 8-8' and the measuring electrode 9 into a single electrode so as to save space and material cost.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Makino et al 5,676,811.

This claim further differs by calling for the reference electrode to be situated on a side of the reference gas channel nearest the large surface of the sensor element exposed to a sample gas mixture.

Makino discloses reference electrode 13 located on a side of a reference gas channel 19 nearest the large surface of a sensor element exposed to a sample mixture. See figure 1; col. 4, line 20 to col. 5, line 23. It would have been obvious for Friese to locate its reference electrode 11 on the opposite surface of the reference gas channel in view of Makino. The incorporation of a known feature functioning as expected from analogous prior art is within the skill of the art.

Claims 38, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Sasayama et al 4,900,425.

These claims further differ by calling for the measuring electrode and the reference electrode to have a portion extending outside of the measuring electrode chamber and the reference gas channel respectively.

Sasayama discloses an electrode 12 having a portion extending outside of a gas space 32. See figures 1-3; col. 2, line 9 to col. 4, line 2. It would have been obvious for Friese to extend a portion of its measuring or reference electrode outside of its gas space in view of Sasayama. The

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incorporation of known features functioning as expected from analogous prior art is within the skill of the art.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Yamada 4,505,807.

This claim further differs by calling for a heater located about equidistant from the two large surfaces of the sensor element.

Yamada discloses a heater 13 situated about half way up a sensor element. See figures 1-2; col. 4, line 59 to col. 5, line 47. It would have been obvious for Friese to locate its heater about half way up the sensor element in order to provide uniform, efficient heating throughout the sensor element, as suggested at col. 9, line 27 of Yamada.

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al, with or without Schneider et al, Jach or Logothetis et al, in view of Holfelder et al 4,502,939 or Mase et al 4,797,194.

This claim further differs by calling for a support element in the reference gas channel.

Holfelder discloses a porous filler material 42 within a gas channel acting as a support. See col. 5, lines 12-55. Mase discloses providing supporting means 30, 72 within a gas channel. See col. 7, line 10; col. 8, line 29.

It would have been obvious for Friese to adopt supporting means within its reference gas channel to prevent the narrowing of the channel and maintain proper diffusion.

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Claims 24-26, 28, 31, 33, 41-44, 46, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ep 678740 in view of Schneider et al, Jach or Logothetis et al.

Ep discloses a sensor element comprising a measuring gas chamber 6 and a reference gas channel 10 located in a same zirconia solid electrolyte layer 4b. An inner pump electrode 16 and a measuring electrode 22 are located in the measuring gas chamber opposite each other, while a reference electrode 24 is located in the reference gas channel. See figure 2; col. 11, line 27 to col. 13, line 9. Applicant's claims differ by calling for the solid electrolyte layer containing the gas chamber and the gas channel to be a ceramic paste.

As discussed before, Schneider, Jach or Logothetis discloses applying a zirconia layer to another zirconia layer by screen printing a zirconia paste thereon. It would have been obvious for Ep to apply zirconia layer 4b onto zirconia layer 4a or 4c by screen printing, since that is a common technique.

Claims 27, 34, 35, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ep in view of Schneider et al, Jach or Logothetis et al and Friese et al.

These claims further differ by calling for the electrodes and the gas chamber to be circular or annular.

Friese discloses a circular or annular configuration for its electrodes and gas chamber. See figure 1B. It would have been obvious for Ep to adopt a circular or annular shape for its electrodes and gas chamber in view of Friese, since the incorporation of known configurations from analogous prior art is within the skill of the art. Also, shape is a matter of design choice.

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This claim further differs by calling for the inner pump electrode to also serve as the measuring electrode. As discussed before, that is rendered obvious by Kato.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ep in view of Schneider et al, Jach or Logothetis et al and Makino et al.

This claim further differs by calling for the reference electrode to be located on a side of the reference gas channel nearest the large surface of the sensor element exposed to a sample. As discussed before, that is rendered obvious by Makino.

Claims 38, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friese et al in view of Schneider et al, Jach or Logothetis et al and Sasayama et al.

These claims further differ by calling for the measuring electrode and the reference electrode to have a portion extending outside of its respective gas space. As discussed before, that is rendered obvious by Sasayama.

Claims 40, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ep in view of Schneider et al, Jach or Logothetis et al and Holfelder et al or Mase et al.

These claims further differ by calling for the reference gas channel to have a filler support means. As discussed before, that is rendered obvious by Holfelder or Mase.

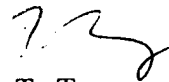
The subject matter of claims 29 and 30 calling for a tapered reference electrode and the reference electrode/reference gas channel being led around the measuring gas chamber is not seen to be disclosed or fairly suggested by the prior art of record.

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In the specification, page 2, line 32 and page 3, line 16 the wording does not read correctly. Applicant should review the entire specification for other informalities.

Roy et al 3,776,831 discloses forming a solid electrolyte layer onto another solid electrolyte layer. See col. 3, line 65 to col. 4, line 18.

The examiner can be reached at 703-308-3329. His supervisor Nam Nguyen can be reached at 703-308-3322. Any general inquiry should be directed to the receptionist at 703-308-0661. A fax number for TC 1700 is 703-872-9310.



Ta Tung

Primary Examiner

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